# WILLINGNESS TO PAY FOR THE HIGH COUNTRY FARM TOUR

A Thesis
by
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**Abstract**

WILLINGNESS TO PAY FOR THE HIGH COUNTRY FARM TOUR

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This research aims to provide motivations for participation from the consumer perspective in agricultural farm tours in the western portion of North Carolina. Results of a survey taken from participants in the High Country Farm Tour will be utilized to perform regression analysis to estimate the demand for the farm tour. By using data on stated preferences, we estimate consumer motivation of participation based on market development, social interaction and various pricing concepts. While much research has been completed on the motivation of farmers to commence tourism enterprises, relatively less research is available regarding consumer motivation in participation of such. Moreover, as motivation for participation will vary among participants, our research will determine the effects of changes in price of tickets and ticketing scheme on revenues. Thus, the hypothesis of the paper will be testing the effect of prices on participation using the linear probability model.

## Acknowledgments

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# 1 Introduction

## *1.1. Rationale and organization of study*

Blue Ridge Women in Agriculture is dedicated to strengthening the High Country's local food system by supporting women and their families with resources, education, and skills related to sustainable food and agriculture. The High Country Farm Tour is hosted by the Blue Ridge Women in Agriculture (BRWIA). In 2011, the High Country Farm Tour featured 20 farms in five counties and attracted over 500 visitors. For 2012 the Farm Tour featured 22 farms in three counties. BRWIA has hosted the High Country Farm Tour to strengthen our local food system by connecting producers and consumers, educating the public about sustainable food and agriculture, and providing farmers with opportunities to increase their income. The event allows participants to tour local, sustainable farms and discover meat, dairy, fruits, fish and veggies produced locally. The tour is self-guided and farms are located throughout Watauga, Ashe, and Caldwell counties. Participants choose the farms they wish to visit and visit in any order. Most farms sell their products and provide details of the history of the farm during the tour visit. The farm tour is a major revenue source for BRWIA. BRWIA is considering individual tickets, instead of group tickets, for the 2013 High Country Farm Tour in order to increase revenue.

This research aims to provide motivations for participation from the consumer perspective in agricultural farm tours in the western portion of North Carolina. A survey was created for use to measure consumer sentiment of the High Country Farm Tour that took place on August 4$^{th}$ and 5$^{th}$, 2012. Results of the survey taken were utilized to estimate the demand for farm tour participation. Such quantitative demand analysis as own price elasticity of demand and its relationship to marginal and total revenue are analyzed. By using data on stated preferences for the farm tour, it is capable of estimating consumer motivation of participation based on market development and various pricing concepts.

The ultimate goal of the study is to determine the optimal pricing strategy for the 2013 tour season.

### *1.2. Background*

Farm tourism means commercial tourism enterprises on working farms (Busby & Rendle, 2000). Farm tourism enterprises combine the commercial constraints of regional tourism, the nonfinancial features of family businesses, and the inheritance issues of family farms. They have theoretical significance in regional tourism geography and economics, family tourism business dynamics and rural diversification (Ollenburg & Buckley, 2007).

Chen, Chang and Cheng (2010) concluded that in today's travel market, farm tourism has gradually received attention from the masses. The momentum of this surging demand is partially attributed to the marketing effort by concerned locals, trade associations, and the governments that cherish their farming heritage, at the same time boosting their community morale by rendering new experiences and activities to tourists at farm settings with small-scale operations.

For tourism promotion agencies, farm tourism is one component of the tourism sector, an attraction for regional travelers, but this is not necessarily how it is perceived by the farm tourism operators themselves. Factors that motivate farm landholders to operate tourism enterprises have considerable social and economic significance (Ollenburg & Buckley, 2007).

Carpio, Wohlgenant, and Boonsaeng (2008) have analyzed the American 2000 National Survey on Recreation and the Environment, and found that the average farm visitor compared with the average non visitor was more educated, had a higher family income, was younger, and belonged to a household with more family members. They found no significant difference between men and women in their probability to visit a farm, but male visitors have a higher number of visits, and they found that someone living in urban areas was 5% less likely to visit a farm than someone living in rural areas.

Nickerson et al. (2001) amplify the importance of looking more closely at the social dimensions of farm businesses:

> Recreation and tourism are social businesses. Farm/ranch recreation providers must have an understanding of why people recreate, particularly if they want to stay in business in such a specialized market. Providers must also have good interpersonal skills to make agritourism businesses successful. We predict that farmers/ranchers who fall into the multidimensional cluster (i.e., they are highest on social reasons for diversification) will be most successful in recreation (p. 25-26).

The results of this review show that farm tourism has increased in popularity and that there has been a steady increase of people visiting farm tourism enterprises. As with all forms of niche marketing, consumer-based research is essential to the further development of farm tourism. While there is ample research on the supply side of farm tourism, consumer research is lacking. Specifically the interdependence of factors such as market development, travel costs, social interaction and various costing concepts.

Visitor experiences and customer satisfaction are complex phenomena to measure and analyze. Among marketing researchers, no single approach prevails as the best method for analyzing gathered data (Capriello, Mason, Davis, & Crotts, 2011).

The farm experience is becoming more important, as guests want to participate and consume farm products. More and more people are looking for new experiences, and they are seeking connections with nature. The farm tourism business can satisfy their needs by using distinct cultural, natural, and green characteristics of the agricultural industry. As farm-based tourism continues to thrive, it is likely to be a viable market. In formulating effective marketing strategies, tourism studies have investigated farm tourists' behaviors in an effort to understand consumers' needs and expectations concerning farm based products and services (Chen, Chang, & Cheng, 2010).

### *1.3. Conceptual Framework*

Historically, people from the cities have turned to the countryside for recreation and holidays. Blekesaune, Brandth, & Haugen (2010) discovered that what is new is the scope and variety of activities and the increased demands for market-orientation, professionalism and flexibility of the services offered, along with increased demands for quality and competence.

Farm tourism requires management of several factors on as well as off the farm. Each individual factor and the combination of factors need attention. Doing this in a good way can give benefits for firms and the farm tourism sector (Forbord, Schermer, & Griebmair, 2011).

The family farm is not only a home, but also a business. The responsibilities of running a rural farm are driven by the cyclical nature of planting and harvesting crops, and the daily responsibilities of caring for livestock (Trussell & Shaw, 2007). Opening a working farm to visitors offers a secondary revenue source, but only if the farm's capacity and market demand is sufficient to offset the increased costs (Wilson, 2007).

Ollenburg and Buckley (2007) reported that for full-time operators, tourism is secondary to farming, and may be abandoned if financial returns from farming improve. For part-time farmers, tourism is a substitute for off-farm income; if farming conditions improve, they may continue tourism but abandon off-farm employment. Retirement and lifestyle farmers are generally unable to capitalize on improved farming conditions; tourism is their main income even when farming conditions are good.

According to Forbord, Schermer, & Griebmair (2011), tourism products would not be available without organization. Although such a process can take place without any formal organization (Scott & Davis, 2007), there is little reason to believe that formal organizing does not play a role in shaping the farm tourism sector (Forbord, Schermer, & Griebmair, 2011). Studies have shown that successful farm tourism firms work co-operatively, rather than individualistically and competitively (Che,Veeck, & Veeck, 2005; Hill & Busby, 2002), and that being involved with associations contributes positively to the gross income on tourism farms (Barbieri & Mshenga, 2008).

### *1.4. Objectives and research questions*

While much research has been completed on the motivation of farmers to commence tourism enterprises; relatively less research is available regarding consumer motivation in participation. As motivation for participation will vary among participants, this research will consider the interdependence of factors involved in the survey in relation to social interaction and price of tickets. Thus the hypothesis of the paper will be testing the effect of ticket price and scheme changes using the linear probability model.

The idea is to determine the revenue maximizing group and individual ticket price. Also, will BRWIA increase revenue if they switch from group to individual prices? To make this determination the understanding of group size and if respondents are more or less likely to travel in groups with individual tickets must be considered.

## 2 Materials and methods

### *2.1. Computations*

A research survey was developed by faculty and students in the Department of Economics at Appalachian State University in cooperation with Blue Ridge Women in Agriculture. The survey questionnaire was emailed to the participants of the 2012 High Country Farm Tour on date, with reminders on date and data. The questions were derived from the Department of Economics' prior experience in agriculture-related events and surveys. Seventy-seven responses were collected out of which 64 were used in the analysis. Survey response rate was 51% of the questionnaires sent via email. Raw data from the survey results and data labels were created to manage the data and generate a pseudo-panel dataset, 64 individuals and 5 time periods. The 5 time periods are the demands at five different prices.

There were four dependent variables for a regression analysis: vlikely1, swlikely1, vlikely2, swlikely2. Vlikely is equal to 1 if the respondent is very likely to pay the group or individual ticket price. Swlikely is equal to 1 if the respondent is very likely or somewhat likely to pay. The 1 and 2 are for group and individual tickets. If vlikely understates demand and swlikely overstates demand the data provides bounds for a demand forecast. The models to be estimated are vlikely1 = f(price1), swlikely 1 = f(price1), vlikely2 = f(price2), swlikely2 = f(price2).

Own-price elasticity measures the responsiveness of one variable to changes in another variable. The own price elasticity of demand for good X, denoted $E_{Qx,px}$, is defined as $E_{Qx,Px}=\%\Delta Q^{d}_{x} / \%\Delta P_{x}$ which is a measure of the responsiveness of the quantity demanded of a good to a change in the price of that good. Through proper analysis of this concept we will be able to determine the quantitative impact of price changes to farm tour participation and revenues.

As we are aware, increasing price does not always increase revenues. There are ranges on a linear demand curve when an increase in price will increase and decrease total revenue. When the absolute value of the own-price elasticity (OPE) is less than 1; an increase in price increases total revenue. When the absolute value of the own-price elasticity (OPE) is greater than 1; an increase in price leads to a reduction in total revenue. By utilizing the own-price elasticity, we will be able to more accurately determine the amount by which demand will move when certain variables change. This information will allow us to reasonably predict what effect the proposed change in ticket prices and different pricing schemes may have on participation in the 2013 High Country Farm Tour.

### *2.2. Case-oriented comparison*

A case study approach is a desirable research strategy when the purpose is to understand complex social phenomena, e.g., organizational and managerial processes and the maturation of industries (Yin, 2003). A case study gives good opportunities to bring particular historical, cultural and geographical conditions into the analysis. Multiple cases make it possible to consider different combinations of conditions and provide alternative explanations for an outcome (Ragin, 1987). More specifically, a case study provides possibilities to describe how a particular configuration of factors produces certain outcomes (Forbord, Schermer, & Griebmair, 2011).

Several case studies in relation to farm tourism with various areas of concentration were considered as outlined in Section 3 of this report. By considering these studies with the elasticity and regression analysis, a more thorough understanding of the consumer sentiments can be realized.

## 3 Study areas

### *3.1. Motivation for Participation*

The driving force of farm tourism demand might be attributed to increased environmental awareness according to Chen, Chang and Cheng (2010). "Experience economy," a phenomenon that some economists have named (Pine & Gilmore, 1999), predicts that there is a growing interest in linking experiences with traditional products and services. Everett and Aitchison (2008) argue that a shift in the approach to food is apparent in recent tourism studies. This literature has traditionally focused on the role of food as economic generator and marketing tool. The countryside is thus often conceived of as meeting consumer demands with its envisaged authenticity, esthetical idyll, rural idyll, heritage, cuisine and small-scale traditional food production (Hall, Mitchell, and Roberts, 2003). Basically, better organized marketing of farm tourism, increased product diversification, and new trends in tourist demands will continue the trend of increased numbers of visitors and increased interest in farm tourism.

An exploratory study was conducted by Capriello, Mason, Davis and Crotts (2011) on consumer reactions to farm visits. Three methods were applied individually to one large qualitative database. Log likelihood comparisons of recurrent themes or word clusters in the significant sections show that references to family, family-friendly activities and animal and farming details were predominant themes. Also the cost of gas was mentioned frequently.

### *3.2. Market Segmentation*

Developing a farm tourism business should be designed from the customer's perspective (Nickerson, Black, & McCool, 2001). Tourist preferences for sustainable tourism products vary according to their demographic and socioeconomic characteristics. Results from a large sample in the Blue Ridge National Heritage Area found preference differences based on gender, age, education level, and income, as well as whether the tourist was a day-tripper or overnight visitor (Stoddard, Evans, & Dave, 2008).

The marketing strategy of many tourism organizations is predicated on the theory that tourists are heterogeneous with respect to their purchasing habits. This assumption is often verified by data that show that certain segments of customers buy more of a product than other segments. Often, these various market segments are defined by demographic or socioeconomic variables such as age, education, and income (Frank & Massey, 1965).

### *3.3. Target Markets*

Results from the research completed by Stoddard, Evans, and Dave (2008) suggest that preferences for sustainable tourism products vary according to tourists' demographic and socioeconomic characteristics. The study found that tourists in various demographic and socioeconomic groups did have diverse preferences for tourism activities. Results suggest that promotions of music and craft activities should be directed at older, more affluent overnight visitors. Younger visitors could be drawn by promoting outdoor activities such as hiking and biking trails, as well as gardens, arboretums, and orchards and vineyards.

Also discovered in the study by Stoddard, Evans, and Dave (2008), the promotion for the Blue Ridge area would best be directed toward major metropolitan areas in the southeast United States, from North Carolina to Florida and as far west as the Mississippi River. This study also found that the bulk of visitors originate in the southeastern United States, suggesting that promotions for the Blue Ridge area should be directed to those living in North Carolina and vicinity.

Compared to other travelers to North Carolina, visitors to the BRNHA skewed toward being a bit older, having higher household incomes, and having attained high education levels.

Visitors of the BRNHA were few day-trippers and more overnight visitors compared to other national heritage areas that were studied in a 2005 study. As has been the case with other studies, this study found that women preferred crafts, men preferred outdoor activities, younger people were more likely to choose outdoor activities, and those with high incomes preferred gardens and trails.

## *4 Results*

The survey was composed of several sections. The section of most interest for this research includes the respondent answers to preferences for pricing schemes, and the demographic and socioeconomic characteristics.

Table 1 details the respondents' social-demographic traits. More than 65% of the respondents were female; the majority was not considered students; the largest age category was 60 or older; a large majority was married; more than 82% had a bachelor or graduate degree; and the largest income section was $60,000 to $75,000 per household. In contrast, the variables that were less represented included the age category of 18 to 39, the education level of some college or below, and the income levels of $40,000 and below.

**TABLE 1** Tourists' Social-Demographic Traits

| | % | Count |
|---|---|---|
| **Sex** | | |
| Male | 34.70 | 25 |
| Female | 65.30 | 47 |
| **Student** | | |
| No | 93.10 | 67 |
| Yes, Full-time | 5.60 | 4 |
| Yes, Part-time | 1.40 | 1 |
| **Age** | | |
| 18 – 2**9** | 12.50 | 9 |
| 30 – 39 | 9.70 | 7 |
| 40 – 49 | 16.70 | 12 |
| 50 – 59 | 18.10 | 13 |
| 60 – older | 43.10 | 31 |
| **Marital status** | | |
| Married | 73.20 | 52 |
| Widowed | 4.20 | 3 |
| Divorced | 2.80 | 2 |
| Separated | 2.80 | 2 |
| Never married | 16.90 | 12 |
| **Education Level** | | |
| High school or equivalent or less | 2.80 | 2 |
| Some college | 11.10 | 8 |
| Associate degree | 4.20 | 3 |
| Bachelor degree | 38.90 | 28 |
| Graduate degree | 43.10 | 31 |
| **Household Income** | | |
| Below $30,000 | 8.06 | 5 |
| 30,000 – 40,000 | 11.29 | 7 |
| 40,000 – 60,000 | 16.13 | 10 |
| 60,000 – 75,000 | 17.74 | 11 |
| 75,000 – 100,000 | 14.52 | 9 |
| 100,000 – 125,000 | 12.90 | 8 |
| 125,000 – 200,000 | 12.90 | 8 |
| 200,000 and above | 6.45 | 4 |

Of the respondents a moderate percentage had participated in previous High Country Farm Tours (Table 2).

**Table 2** Tourist's Participation Level

| Year | % | Count |
|---|---|---|
| 2012 | 100.00 | 72 |
| 2011 | 23.70 | 18 |
| 2010 | 18.40 | 14 |
| 2009 | 13.20 | 10 |

Approximately 95% stated they were either moderately satisfied or extremely satisfied with their experience with the 2012 tour. As for the respondents' social interaction traits, only 10% traveled alone while the remaining 89% traveled within a group (Table 3).

**Table 3** Group Size

| | % | Count |
|---|---|---|
| **1** | 9.72 | 7 |
| **2** | 50.00 | 36 |
| **3** | 13.89 | 10 |
| **4** | 18.06 | 13 |
| **5** | 6.94 | 5 |
| **6** | 0.00 | 0 |
| **More than 6** | 1.39 | 1 |

Respondents were asked about their preferred mode of travel with an individual ticket scheme (Table 4). With the intent to encourage farm tour participation among groups and determine any potential demand from this market, a survey question was included to gauge if the change in the pricing scheme would encourage an increased demand from groups. Table 4 clearly shows that the addition of an individual ticket would have no such effect of increased demand from the targeted market.

**Table 4** Tourist's Group Travel if individual ticket available

| | % | Count |
|---|---|---|
| **Much more likely** | 7.20 | 5 |
| **Somewhat more likely** | 7.20 | 5 |
| **Neither more or less likely** | 53.60 | 37 |
| **Somewhat less likely** | 18.80 | 13 |
| **Much less likely** | 13.00 | 9 |

Stated preference questions in relation to the pricing scheme were divided into two separate categories, one referring to group ticket prices and the other on individual ticket prices. The responses were measured by a 5-point Likert-scale in the following manner; Not likely at all, Somewhat not likely, Somewhat likely, Very likely, and I don't know. Price scale was in five dollar increments with the group ticket prices range beginning at $20 thru $40 and the individual ticket prices starting at $5 thru $25 (Table 5).

Respondents indicate the most favorable price for group tickets is at the $20 level and the most favorable price is at the $5 level for the individual ticket. Although many factors determine consumer behavior and product demand, the most significant determinant is still price. So, with all other factors held constant, as the price of a product falls, the quantity demanded will rise, and as prices increase, the demand for a product will fall. This concept is obvious in the Somewhat likely and Very likely columns in Table 5.

**Table 5** Pricing Scheme

| Group Ticket Prices | Not Likely | Somewhat not likely | Somewhat likely | Very likely | I don't know |
|---|---|---|---|---|---|
| **$20** | 0.0% (0) | 0.0% (0) | 10.9% (7) | 84.4% (54) | 4.7% (3) |
| **$25** | 0.0% (0) | 4.6% (3) | 15.4% (10) | 76.9% (50) | 3.1% (2) |
| **$30** | 10.3% (6) | 17.2% (10) | 44.8% (26) | 25.9% (15) | 1.7% (1) |
| **$35** | 26.3% (15) | 43.9% (25) | 22.8% (13) | 3.5% (2) | 3.5% (2) |
| **$40** | 55.4% (31) | 32.1% (18) | 7.1% (4) | 1.8% (1) | 3.6% 92) |
| | | | | | |
| **Single Ticket Prices** | **Not Likely** | **Somewhat not likely** | **Somewhat likely** | **Very likely** | **I don't know** |
| **$5** | 1.6% (1) | 0.0% (0) | 8.2% (5) | 88.5% (54) | 1.6% (1) |
| **$10** | 3.1% (2) | 1.6% (1) | 25.5% (16) | 68.8% (44) | 1.6% (1) |
| **$15** | 11.9%(7) | 28.8% (17) | 28.8% (17) | 25.4% (15) | 5.1% (3) |
| **$20** | 43.1%(25) | 32.8% (19) | 10.3% (6) | 10.3% (6) | 3.4% (2) |
| **$25** | 71.4% (40) | 16.1% (9) | 5.4% (3) | 3.5% (2) | 3.6% (2) |

### *4.1. Regression Analysis*

By using ordinary least squares regression linear probability models we are estimating by regressing vlikely and swlikely on the admission price. Vlikely is equal to one of the respondent is very likely to participate in the farm tour, zero otherwise. Swlikely is equal to one if the respondent is somewhat likely and very likely to participate in the farm tour, zero otherwise. The vlikely and swlikely are treated as subgroups to be used as upper and lower-level bounds. The average of the subgroups will then be used to determine the optimal pricing scheme per group.

Utilizing the ordinary least squares method, the linear probability model is estimated: $y = a + bP$, where a and b are regression coefficients, where the expected sign on the coefficients are $a>0$, $b<0$. The data allows the estimation of demand functions for all four data sets of vlikely1 = f(price1), swlikely 1 = f(price1), vlikely2 = f(price2), swlikely2 = f(price2).

This method of estimation results in four demand curves with which, through inverting the demand function, provides the means to calculate total revenue, marginal revenue and own-price elasticity for both the group and individual ticket pricing schemes.

The regression analysis not only provides means for essential calculations, it also provides information as to the significance and reliability of the data. The t-statistic of a parameter estimate is the ratio of the value of the parameter estimate to its standard error. The standard error of each estimated coefficient is a measure of how much each estimated coefficient would vary in regressions based on the same underlying true demand relation, but with different observations (Baye, 2010). A general rule for the t-statistic is the absolute value being greater than 2, the higher the better.

The R-squared statistic tells the fraction of the total variation in the dependent variable that is explained by the regression. The general meaning is that the R-squared function explains the percentage of the total variations across the sample. The closer the R-squared is to 1, the greater the overall fit of the estimated regression equation is to the actual data (Baye, 2010).

While the R-squared provides a guide for overall fit, there is no universal rule for determining how large the number should be to indicate a good fit. The *F*-statistic does not suffer this deficiency. The *F*-statistic provides a measure of the total variation explained by the regression relative to the total unexplained variation. The greater the *F*-statistic, the better the overall fit of the regression lines though the actual data.

**Table 6** Regression Results

| | **Group** | | **Individual** | |
|---|---|---|---|---|
| | **Very Likely** | **Somewhat Likely** | **Very Likely** | **Somewhat likely** |
| **Constant** | 1.791 | 1.95 | 1.013 | 1.205 |
| **(t-stat)** | (21.22) | (21.42) | (20.65) | (24.12) |
| **Price** | -0.0475 | -0.0466 | -0.0431 | -0.0459 |
| **(t-stat)** | (-17.35) | (-15.76) | (-14.59) | (-15.25) |
| **R2** | .486 | .439 | .401 | .422 |
| **F-statistic** | 301.134 | 248.405 | 212.805 | 232.614 |

The value of R-squared ranges from 0 to 100 percent. This model explains 48.6% of the variation in the dependent variable of Group Very Likely and 43.9% of the dependent variable of Group Somewhat Likely. The Individual Very Likely R-squared value is 40.1% and the Individual Somewhat Likely is 42.2%. R-squared tells how well the regression line approximates the real data. A high value of R2 is obviously important in forecasting situations.

F-statistic provides a measure of the total variation explained by the regression relative to the total unexplained variation. The greater the F-statistic, the better the overall fit of the regression line thorough the actual data. The values of 301.134 and 248.405 for the Group Very Likely and Group Somewhat Likely respectively, indicate a significant level of fit. The

Individual Very Likely F-statistic is 212.805 and the Individual Somewhat Likely result is 232.614. These results also represent a significant level of fit.

The t-statistic describes how many standard deviations away the calculated value of the coefficient is from zero. This is significant because if the coefficient for a variable is not different from zero, then the variable doesn't really affect the predicted value. The t-statistics for our constant are all above 20. The absolute values of the t-statistics for price range from 14.59 to 17.25. Since they are both well beyond our general rule of 2.0, we can have some confidence in making observations based on these results.

The sign associated with slope tells us that quantity decreases by .0475 units when price increases by one unit for the Group Very Likely model. The Group Somewhat Likely model indicates that quantity will decrease by .0466 units when price increases by one unit. For the Individual Very Likely model, quantity will decrease by .0431 for price unit increase and quantity will decrease by .0459 units for each price unit increase in the Individual Somewhat Likely model.

Based on these results we can determine that price has a significant negative impact on quantity. As price increases, quantity will decrease respectively.

As detailed in Table 6 above, the regression analysis gives us the coefficients of the intercept and price that allows us to determine the demand function. The formula Q = 1.791 – 0.0475P gives us the demand curve for the vlikely group data set. The same demand functions are created using the coefficients of the intercept and price for each of the remaining three data sets.

Figure 1 shows the inverse demand curve for the demand model of vlikely1 = f(price1) while Figure 2 represents the inverse demand curve for the demand model of swlikely1 = f(price1).

***Figure 1 Inverse Demand Curve for vlikely1 = f(price1)***

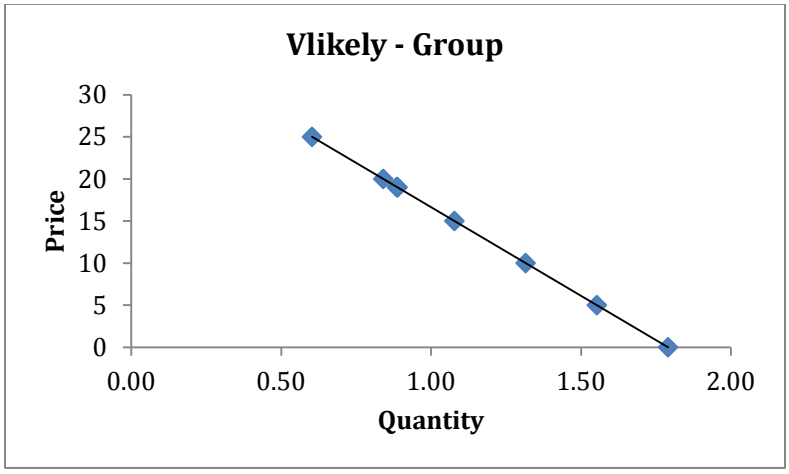



***Figure 2 Inverse Demand Curve for swlikely1 = f(price1)***

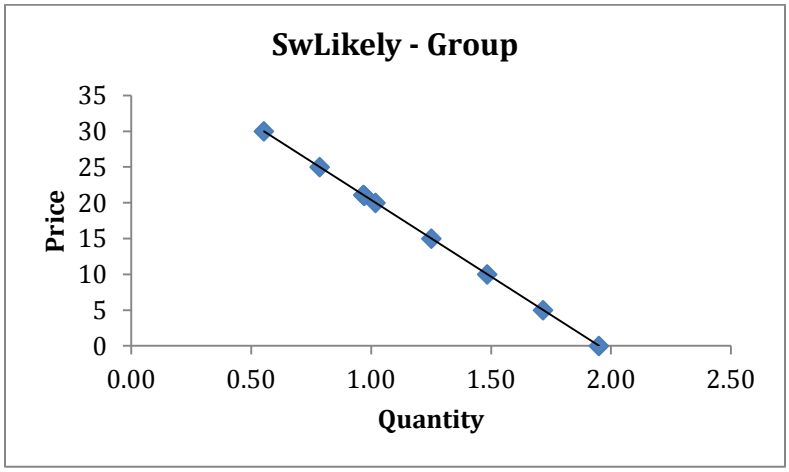


Figure 3 shows the inverse demand curve for the demand model of vlikely2 = f(price2) and figure 4 represents the inverse demand curve for the demand model of swlikely2 = f(price2).

***Figure 3 Inverse Demand Curve for vlikely2 = f(price2)***

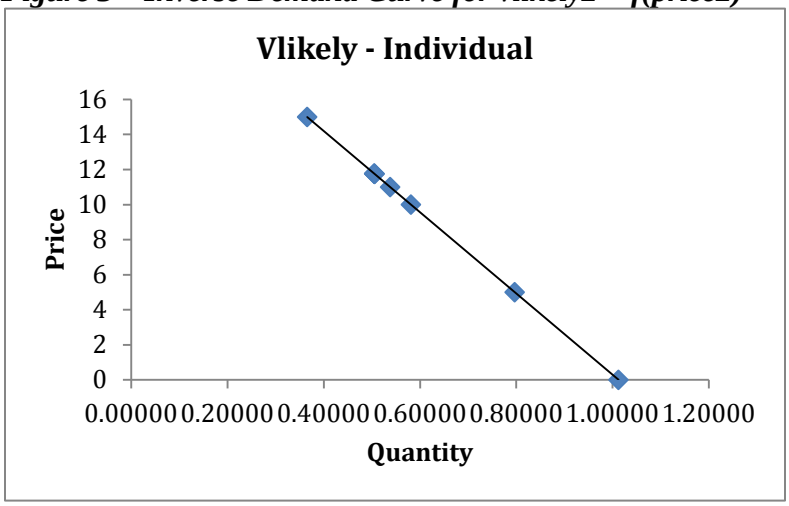
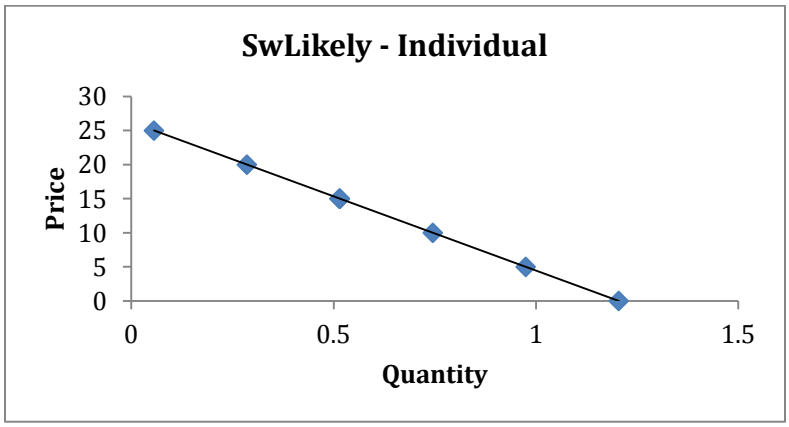



***Figure 4 Inverse Demand Curve for swlikely2 = f(price2)***




To find the total revenue (TR) and marginal revenue (MR) for this data set, we use the inverse demand function as P = 37.697 – 21.053Q.

To determine which pricing scheme provides the greatest total revenue it is necessary to solve the following equation Total Revenue (TR) = Price (P) * Quantity (Q) for each price level. Marginal revenue is the change in total revenue due to a change in quantity. This relationship among the changes in price, elasticity, and total revenue is called the total revenue test.

Demand is elastic if the absolute value of the own price elasticity (OPE) is greater than 1. Demand is inelastic if the absolute value of the own price elasticity is less than 1. If demand is elastic, an increase (decrease) in price will lead to a decrease (increase) in total revenue. If demand is inelastic, an increase (decrease) in price will lead to an increase (decrease) in total revenue. Total revenue is maximized at the point where demand is unitary elastic (Baye, 2010).

Table 7 represents the revenue analysis for the group pricing scheme while Table 8 summarizes the revenue analysis for individual pricing scheme. Notice in Table 7 and Table 8 that the absolute value of the OPE gets larger as price increases. Thus, the OPE of demand varies along a linear demand curve.

The price-quantity combination that maximizes total revenue in Table 7 and Table 8 is at the point where the OPE equals 1, which is also the point that MR = 0. Revenue is maximized at the quantity that makes MR = 0. Since the vlikely calculation may understate expected demand and the swlikely calculation may overstate it, the correct forecast is likely in between.

**Table 7** Regression Analysis – Simulation

**Group - Vlikely**

| | | | | | |
|---|---|---|---|---|---|
| Demand Function | Q= | 1.790625 | -0.0475 | P | |
| Inverse Demand | P= | 37.69737 | -21.05263 | Q | |
| | **P** | **Q** | **TR** | **MR** | **OPE** |
| | 0.00 | 1.79063 | 0.00 | ---- | ---- |
| | 5.00 | 1.55313 | 7.76563 | 7.766 | 0.133 |
| | 10.00 | 1.31563 | 13.15625 | 5.391 | 0.153 |
| | 15.00 | 1.07813 | 16.17188 | 3.016 | 0.361 |
| | 19.01 | 0.88765 | 16.87423 | 0.000 | 1.016 |
| | 20.00 | 0.84063 | 16.81250 | -0.061 | 1.022 |
| | 25.00 | 0.60313 | 15.07813 | -1.734 | 1.130 |

**Group - Swlikely**

| | | | | | |
|---|---|---|---|---|---|
| Demand Function | Q= | 1.95 | -0.046562 | P | |
| Inverse Demand | P= | 41.87919 | -2147651 | Q | |
| | **P** | **Q** | **TR** | **MR** | **OPE** |
| | 0.00 | 1.95000 | 0.00 | ---- | --- |
| | 5.00 | 1.71719 | 8.58594 | 8.586 | 0.119 |
| | 10.00 | 1.48438 | 14.84375 | 6.258 | 0.136 |
| | 15.00 | 1.25156 | 18.77344 | 3.930 | 0.314 |
| | 20.00 | 1.01875 | 20.37500 | 1.602 | 0.558 |
| | 21.01 | 0.97172 | 20.41588 | 0.000 | 1.006 |
| | 25.00 | 0.78594 | 19.64844 | -0.766 | 1.015 |

**Table 8** Regression Analysis – Simulation

**Individual – Vlikely**

| | | | | | |
|---|---|---|---|---|---|
| Demand Function | Q= | 1.0125 | -0.043125 | P | |
| Inverse Demand | P= | 23.47826 | -23.18841 | Q | |
| | **P** | **Q** | **TR** | **MR** | **OPE** |
| | 0.00 | 1.01250 | 0.00 | --- | --- |
| | 5.00 | 0.79688 | 3.98438 | 3.984 | 0.213 |
| | 10.00 | 0.58125 | 5.81250 | 1.828 | 0.271 |
| | 11.00 | 0.53813 | 5.91938 | 0.107 | 0.742 |
| | 11.76 | 0.50535 | 5.94292 | 0.000 | 1.002 |
| | 11.77 | 0.50492 | 5.94289 | 0.000 | 1.004 |
| | 15.00 | 0.36563 | 5.48438 | -0.459 | 1.005 |

**Individual – Swlikely**

| | | | | | |
|---|---|---|---|---|---|
| Demand Function | Q= | 1.790625 | -0.0475 | P | |
| Inverse Demand | P= | 37.69737 | -21.05263 | Q | |
| | **P** | **Q** | **TR** | **MR** | **OPE** |
| | 0.00 | 1.20469 | 0.00 | 0.00 | 0.00 |
| | 5.00 | 0.97500 | 4.87500 | 4.875 | -0.764 |
| | 10.00 | 0.74531 | 7.45313 | 2.578 | 0.236 |
| | 15.00 | 0.51563 | 7.73438 | 0.281 | 0.616 |
| | 15.01 | 0.51517 | 7.73264 | -0.002 | 1.336 |
| | 20.00 | 0.28594 | 5.71875 | -2.012 | 1.347 |
| | 25.00 | 0.05625 | 1.40625 | -4.313 | 3.213 |

With the vlikely and swlikely acting as subgroups used as upper and lower-level limits, the average of the subgroups will be used to determine the optimal pricing scheme per pricing concept. Table 9 details the results of both categories as bounds for a demand forecast. Based on the survey responses only, and not the total demand for the farm tour, the total individual demand calculates to 165, the average party size multiplied by the number of groups, with group demand at 64.

By averaging the data sets, the optimal pricing level is determined for each pricing concept in addition to the corresponding quantity percentage. The correlated percentage of quantity is multiplied by the appropriate demand category, group, or individual, to determine overall quantity for the data set. This quantity is then multiplied to the optimal price to determine the TR for the respective pricing concept.

| **Table 9** Summary / Recommendation | | | |
|---|---|---|---|
| Average Party Size | 2.578 | | |
| Total Demand from Sample | 165 | | |
| Total Number of Groups | 64 | | |
| **BOUNDS** | | | |
| **With Projected Price – VL** | P | Q | TR |
| Group (88.77%) | 19.01 | 56.8096 | 1,079.95 |
| Individual (50.54%) | 11.76 | 83.38275 | 980.58 |
| **With Projected Price –SwL** | P | Q | TR |
| Group (97.17) | 21.01 | 62.19008 | 1,306.61 |
| Individual (52.52%) | 15.01 | 85.00305 | 1,275.90 |
| **OPTIMAL REVENUE** | **P** | **Q** | **TR** |
| Group (90%) | 20.00 | 57.6 | 1,152.00 |
| Individual (50%) | 12.50 | 82.5 | 1.031.25 |

## *5. Conclusion and Recommendation*

The BRWIA is considering changing from a group pricing concept to an individual pricing concept for the 2013 High Country Farm Tour. This research was to determine the optimal pricing scheme that would maximize the BRWIA's total revenue for the 2013 season.

Through the utilization of ordinary least squares regression linear probability models it is estimated the group pricing scheme would optimize total revenue, given the demand remains as current.

The mixture of the economic data analyzed within this study and the case studies noted throughout highlights the necessity of additional research into the effect of demand shifters within the specific market. Particular focus should be on the interdependence of factors such as market development, relationship with other local farm tours, the effect of travel costs, demographics and socioeconomic factors. It would also be beneficial to complete a sensitivity analysis for changes in group size with the change in pricing scheme or with the addition of a pricing concept mix.

Continued research should be prepared to determine the proper market segment and target for the farm tour industry. While the case studies analyzed within this research assisted in generalizing certain target areas, additional research is necessary to make the targeted market segment more specific.

As concluded in Table 9 the group pricing concept allows for greater total revenue than the individual pricing scheme. Therefore it is recommended that the BRWIA 2013 High Country Farm Tour maintain the group pricing concept.

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## Vita

Jeff Kniceley was born in Sutton, West Virginia, to Nolan and Mary Jo Kniceley. He graduated from Braxton County High School in May 1985. Upon graduation he moved to Shelby, North Carolina to pursue his education. He graduated Alpha Sigma Lambda and Summa Cum Laude from Gardner-Webb University with a Bachelor of Science degree in December 2008. He began his studies at Appalachian State University in the fall of 2010 and was awarded his Master of Business Administration with a concentration in Economics in December 2012.

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